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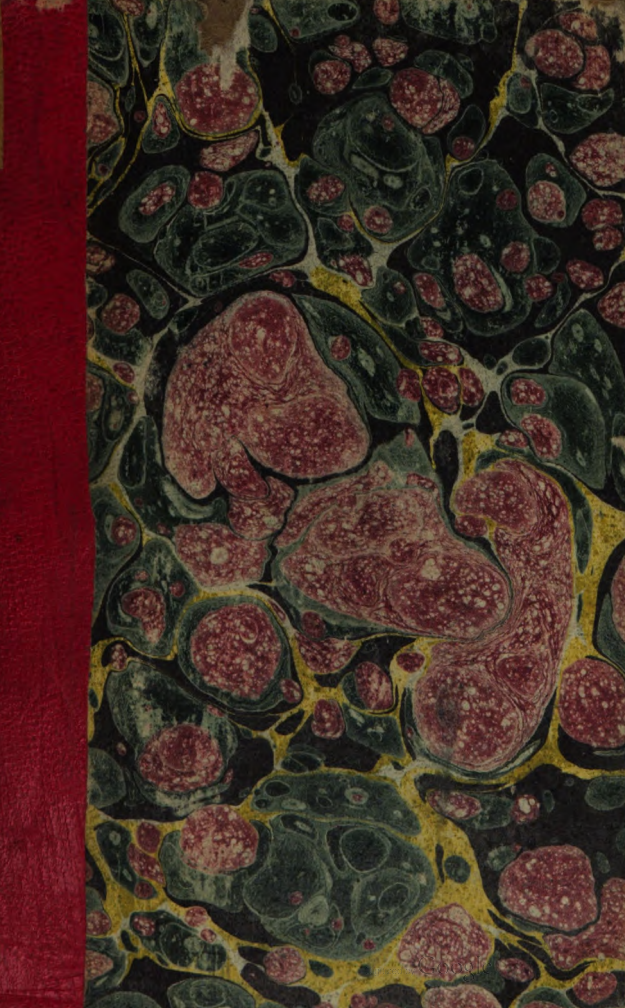
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ILLUSTRATED

Domestic Hand-Book for Invalids.

ON

COMPLAINTS OF THE BLADDER,

AND

DISORDERED URINE, GRAVEL,

ETC.

COMPRISING ALSO

**AN EPITOME OF LIEBIG'S THEORY OF
ANIMAL CHEMISTRY,**

AND

ITS APPLICATION TO THE ABOVE DISORDERS.

BY

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as to its importance, or the necessity of some abridgment of the enjoyments of existence, and a little attention to regimen and physicking, is looked upon with suspicion or surprise, lest he, the patient, become the victim of medical imposture.

In the "Arabian Nights' Entertainments" there is a tale told, wherein the hero is presented by some presiding genius with a ring, which he is enjoined to wear; the magic power of which is to be exemplified by a proportionate pressure of the finger, to admonish him whenever he displeases his patron by a departure from the paths of virtue. All imaginings are in some way derived from actual occurrences. The fanciful story of the Eastern prince is but a contortion of a fact in human nature. We are never without a monitor as to where we are to stop or proceed, if we choose to notice it. We have it in mental reflection, or it is present to our sight : and this proposition may be brought down to bear out the remark, that in all our sicknesses (proofs of some transgression) every symptom is a forewarner of another. To present the reader with a less figurative exposition, there is perhaps not a better criterion how far we are obeying the laws, the observance of which preserves our mortal frames in good health, than by examining our own urine. Where is the free liver, the gourmand, or the debauchee, to the luck-

and sides of the vessel, the whole giving forth at the same time a fetid ammoniacal exhalation, as is perceived on entering public urinals. The rapidity with which these several mutations occur, affords some criterion of the healthy or disordered state of the excretion we are talking about ; and hence the usefulness of examining especially the urine of persons labouring under any disorder of the urinary system and functions connected therewith. A patient will complain, for instance, of irritable bladder. The symptoms of that complaint, as far as pain and frequent desire to micturate exist, very closely resemble those affections known by the name of Diabetes, but which is distinguished from the bladder affection in question, by the quantity and character of the urine. Now, in this brief memoir of diseases of the urine, I purpose merely to enumerate their characteristics, selecting only those which are more prevalent, and chiefly with a view to enable the invalid to gather therefrom what may happen to ail him ; it will, therefore, be necessary to explain the phenomena of the creation of urine before its deviation from the healthy state can be understood.

The urine may be fairly looked upon as a waste evacuation from the body : the agents employed therein are the kidneys. A sketch of the back of a human figure is presented, to give an idea of their situation : it will also help

flattened by the weight of the intestines, and obliged to find room where it can in the pelvis, as in pregnant women. Anatomists, in describing the bladder, speak of the *body* (the bulk), the *fundus* or upper part, the *sides*, and the *neck*, where the urethra commences, which, in the male, is surrounded by the prostate gland. The following engraving exhibits the continuation of the urethra into the bladder, and exposes other important structures already alluded to.

FIGURE VI.



a The inner surface of the bladder, shewing the direction of the muscular fibres.

b The opening of the right ureter into the bladder, whence the urine issues.

c c The prostate gland, with its sides cut through and exhibited.

d The urethra.

e An eminence, called, the verumontanum.

f f Orifices of the seminal ducts, marked by twigs inserted therein. The other points mark the orifices from the prostate and other glands.

Coats of the
Bladder.

The bladder is composed of several coats. There is a peculiar membrane investing the important structures in the abdomen, called the *peritoneum* (see engraving, &c., in my little work on "Constipation and Diseases of the Intestines"). The fundus and back part of the bladder are covered by a portion of this peritoneum, which serves, in some measure, to support the bladder in its position, and also to exercise certain physiological properties, which may hereafter be alluded to.*

The muscular coats of the bladder are very strong: they consist of fibres running in three different directions; and the name given to the upper is the *detrusor urinæ*, and to the lower, the *sphincter*. An idea of their strength may be given, when it is stated, that the bladder is capable of containing *per force*, from two to three pints of urine, the whole of which can be ejected to the last drop. The force of ejection differs with all individuals, and is also dependent upon the state of health. The next coat is called the *nervous* and *cellular coat*. The inner coat is bedewed with a soft sheathing of mucus, which protects the bladder from the

* I have a museum at my house in Arundel-street, Strand, of upwards of two hundred illustrations of the anatomy and diseases of the urinary and generative organs of both sexes, to which professional men or scientific persons will be admitted any morning by appointment.

acrimony of the urine. The bladder, when distended, is equally smooth all over; but at other times it falls into *folds* or *rugæ*; and, when quite empty, it collapses into a triangular flap. These coats are severally subject to inflammation, which have their separate indications.

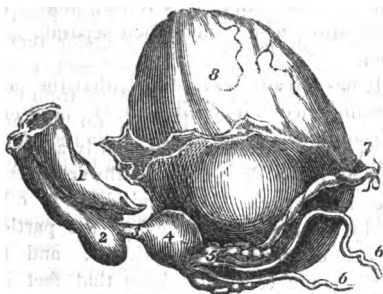
It has already been stated, that the bladder is maintained in its position by the peritoneum: it also derives great support from its connexion with the urethra, which is fixed by ligamentous and muscular attachments to the sides of the pubes. We hear, occasionally, of many peculiarities, independently of diseases of the viscus, such as a plurality of bladders, divisions of the one into compartments, &c.

In the last engraving, the situation of the ureter is explained, through which the urine distils from the kidney. The ureters open very obliquely into the bladder, for the two-fold purpose of preventing a retrogression of the urine, and its too rapid descent into the bladder. The bladder, as the urine accumulates in it, becomes sensibly excited to contraction, and hence the discharge. The contraction of the *detrusor*, and the relaxation of the *sphincter* muscles, are, however, much at our command or will; but, like every other function, this is liable to derangement upon the indulgence of bad habits.

Having shewn the internal appearance of

the bladder, a diagram is inserted to illustrate its external relations with the urethra, &c.

FIGURE VII.



- | | |
|-----------------------------|-----------------------|
| 1 Corpus cavernosum. | 5 Vesiculæ seminales. |
| 2 Bulb of the urethra. | 6 6 Vasa deferentia. |
| 3 Membranous portion of do. | 7 Ureter. |
| 4 Prostate gland. | 8 The bladder |

An ample description of the bladder and its connexion with the urethra is to be found in my work entitled "Porneiopathology."

The size of the bladder differs in most persons, and in the sexes.

Female Bladder. The female bladder is generally the largest; but the largeness is observable more especially in females who have borne children. The proverbial ability of females to retain their urine longer than men is thus accounted for. The gallantry of those not conversant with the fact just men-

tioned, led them to assign it to the natural delicacy and modesty of the fair sex. These latter essentials doubtlessly influence the property, as they encourage the habit, of retiring as seldom as possible, which, as the function of micturition is considerably under mental control, can be to a very considerable extent regulated; besides which, females, from their usual abstinence from liquids, do not need to empty their bladder so frequently as males. It is at all times dangerous to thwart natural and moral desires. Much mischief is often done by both sexes disobeying the particular "call of nature" to urinate; and the younger branches should have that fact impressed upon them. I have known children acquire a severe and obstinate form of irritability of the bladder by retaining their urine too long. Diseases of the bladder are generally the consequences of other complaints, and those complaints have already been enumerated: they may be thus summed up:—

Causes of Inflammation of the Bladder.	<p>Urethral irritation, extending to the bladder, and producing absolutely a similar affection of the bladder. If the inflammation be not subdued, or do not subside, probably some permanent mischief ensues; at all events, the inflammation extends, and involves other coats than the interior; accordingly, we have inflammation of the muscular coat, the nervous coat, and</p>
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lastly, the peritoneal coat ; these terminations, severally, have certain symptoms, and certain names.

There are others ; and among them may be named colds, local injuries, hæmorrhoids, excess in drinking particular fluids, sensual indulgences, diseased condition of the kidneys, or long retention or vitiated states of the urine, nervousness, and lastly, the formation of stone in the bladder. The most common form of bladder ailment is irritability, which is a milder term for inflammation ; then we have absolutely inflammation ; and lastly, loss of power, or paralysis.

**Irritability of
the Bladder.**

The chief indication of disease affecting the bladder is a frequent desire which the patient experiences to pass his water ; but that symptom alone does not determine the nature of the complaint. It may be irritable from sympathy with surrounding irritation, and disappear on the subsidence of that irritation. It may be constantly fretting the patient by its contractions, through the urine (owing to some general derangement in the system) being altered in its chemical qualities, and exciting the bladder the moment it is secreted therein ; or it may be the result of nervous agitation, with or without any actual diseased state of the bladder. These causes should be understood to regulate the treatment, which of course must be qualified by

the provocation, and which the patient, when in doubt, had better leave to the discrimination of wiser heads than his own.

Paralysis of the Bladder. The bladder may become, through loss of nervous stimulus, insensible to irritation, and consequently be disobedient to its natural functions. The urine, in these cases, accumulates in large quantities, distending the bladder to its utmost, which it does without pain, and the excess of secretion then dribbles away involuntarily. This state of the bladder is called paralysis, and is an aggravated form of disease, arising from the same causes that establish inflammation, or from some contiguous nervous injury. The treatment of paralysis of the bladder must be entrusted to experienced hands. It consists chiefly of purgatives, stimulative enemata up the rectum and in the bladder, the introduction of the catheter, the cold bath, rest and general medicinal nervous excitants.

Inflammation of the Bladder. Cases of acute inflammation of the bladder are of rare occurrence : but they do occur, occasionally prove fatal, and always are productive of much general disturbance, which yields not without vigorous and active treatment. Urethritis is most usually the exciting cause. On the sudden suppression of the urethral discharge, an inflammation sympathetically seizes the testes, the glands in the groin, or the bladder ; and

when the latter is the seat of the transference, it may be held as the ratio of the severity of the disease.

Symptoms of Inflammation of the Bladder. In inflammation of the bladder there is a constant desire to pass water, which, when made, is

usually in very small quantities, and leaves a sediment. The patient often experiences an insupportable inclination to urinate, with a sensation as though the bladder were ready to burst, whereas there may be little or no urine in it. There is much pain at the neck of the bladder, and it extends along the perineum to the rectum, which latter is assailed with almost constant spasms, resembling straining. There is considerable thirst, fever, and anxiety; the pulse is full and thick, the tongue furred, and all those symptoms are present that prevail during severe constitutional excitement.

Treatment of Inflammation of the Bladder. The treatment consists of bleed-

ing, leeching or cupping, relieving the bowels by castor oil and injections, giving mucilaginous drinks, administering opiates, preserving rest, and total abstinence from stimulating diet. If these means fail in subduing the inflammation, it runs on to ulceration, permitting extravasation of urine, occasioning mortification and death; but where they are effectual, the patient is soon left free from complaint. It often happens that the inflammation is not so vigorously

treated, or it may be wholly neglected, and yet it may happily resolve itself without proceeding to the extremity narrated; but, unfortunately, it may degenerate into a minor but not less troublesome form, denominated chronic, and which, in fact, is the disease christened "irritability," and the one, for obvious reasons, as above stated, for which relief is most usually sought, the patient having in vain daily looked for the subsidence of his malady. Having stated that irritability of the bladder must be treated with reference to its cause, it is obvious that more than non-medical discrimination is required. Where it depends upon stricture, the stricture must first be cured—where upon stone in the bladder, the stone must be removed—where upon sympathetic inflammation, the source must be attacked, and so on.

However, it has been stated that other causes may exist, that it may even be a primary disease in itself; and, as 'Porneiopathology' professes to be a private mentor to the invalid, it may be safely referred to by those who, from delicacy, decline consulting a surgeon, in preference to leaving the disease to its own course. The surgeon had, however, best be applied to.

The same diseases just enumerated are incident to both sexes: thus, we have urethritis in the female, affections of the bladder, kidneys, and even stricture of the urethra; but the

urethra, from its shortness in women, is less subject to disturbance than in the male. In urethritis, the urethra of females oftentimes escapes being involved in the disease, which is merely confined to the vagina. The annexed diagram bespeaks the relative connexion alluded to:—

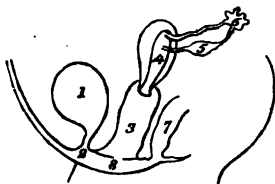


FIGURE VIII.

- 1 Bladder.
- 2 Urethra.
- 3 Vagina.
- 4 Uterus.
- 5 Ovary.
- 6 Fallopian tube.
- 7 Rectum.
- 8 Orifice.

The female, independently of being liable to urethritis, is also subject to a discharge from the vaginal passage, called *Leucorrhœa*, and which may occur as the result of general or local debility. Its existence is almost always more or less connected with a derangement of the urinary organs, of which it is as frequently the precursor as the consequence. (See '*Portniapathology*.')

The bladder of an adult will contain about two pints of urine. The presence and accumulation of urine urges it to contraction, and to the expulsion of the fluid; and, according to the sensitiveness of the bladder, or the quantity of the urine, are its functions in-

fluenced. Hence, in paralysis, the bladder is sometimes distended to contain double or treble the above quantity ; whereas, in irritability of this said reservoir, scarcely more than a table-spoonful can be retained.

The secretion of urine depends upon the state of the kidneys, and also the fluids consumed, condition of health, &c.

With regard to the formation of the urine, there is this fact observed in physiology—that the parts which receive the arterial blood sent from the heart, possess the property of converting the blood so supplied, both to their own structure and to their several functions.

Secretion of Urine. The kidneys secrete the urine from the blood supplied by the renal arteries ; the secretion is conveyed by the ureters to the bladder, into which it falls, drop after drop : the phenomena of its expulsion by the urethra have already been given. No organ receives such a supply of blood as the kidney, which accounts for the enormous quantity of urine often secreted in a short time. It has been conjectured, from the rapidity with which fluids swallowed pass off from the bladder (as is perceived after drinking gin-and-water, or any other diuretic drink, for instance), that there was some shorter means than the fluids being first taken up in the circulation, and then conveyed by the renal arteries to the kidneys, to be there distilled

into urine; but the supposition has not been supported by proof, and the conclusion submitted to is in accordance with the recognised hypothesis. The character and quantity of the urine is much influenced by age—it being aqueous in infancy, and acrid and fetid as we advance in life. Drink, food, medicines, period of year, state of mind and health, severally operate upon the quantity and quality of urine secreted.

INFLAMMATION OF THE KIDNEYS.

Of course, under all morbid states of urine, the kidneys must be more or less involved; and as inflammation of these glands is indicated by certain symptoms, a description of the leading sensations will put the case beyond a doubt.

The most prominent phenomena are, violent pain in the back, with darting pains along the course of the ureters; a retraction of the testicles, with a numbness of the thigh; the urine very highly coloured, with a frequent desire to void it; generally also there is present, fever, sickness, and constipation. Gouty and rheumatic persons are mostly subject to this complaint.

**Causes of
Inflammation
of the
Kidneys.**

The causes of inflammation of the kidneys are the same as those which produce inflammation of the bladder. The disease oftentimes extends from the urethra upwards, and *vice versa*. "Taking cold in the loins," sleeping in damp beds, hard drinking, violent exercise, sexual excesses, are the most prominent provocatives. One or both kidneys may be effected; and if the inflammation be not subdued, suppuration often ensues, or some chronic change takes place. When an abscess is about to form, the patient has frequent shiverings, with an obtuse pain over the part, which is relieved by pressure. The treatment should be most active, and the case must be submitted to the surgeon.

**Treatment of
Inflammation
of the
Kidneys.**

Bleeding, warm-bathing, fomentations, cupping, leeches, purgatives, mild drinks, and other antiphlogistic measures must be had recourse to. Blisters, so generally useful as counter-irritants, are hurtful in inflammation of the kidneys; in fact, in very sensitive and nervous persons, a blister has been known to produce the complaint in question, from their occasional irritating tendency.

Although this is not the professional term for the disease I am principally about to speak of, yet under this head will the reader, if he be an invalid labouring under a complaint of this character, seek for a description of his own

Incontinence of Urine. case. Incontinence of urine implies a loss of the retentive faculty of the bladder; but there is a species of disease where micturition is carried to such an extent, that a patient will attribute his leaky condition to the above cause. Not so, however, is the case: the urine, in the disease alluded to, is generated or excreted in great quantity; and the bladder merely fulfils its ordinary duty. Of the affection known under the title of incontinence of urine, most persons are aware that it is one of more frequent occurrence in infancy than in adolescence; but the latter is by no means exempt. In childhood it arises, in all probability, from drinking too much; and the bladder becomes, during sleep, overloaded, and *runs over*; or, perhaps, from the irritability induced by its distension, becomes excited to action, and so empties itself—the drowsy state of the child rendering it insensible to the passing circumstances. The infirmity soon becomes a habit, which is often rendered worse by the means taken to check it, namely, chastisement, which is highly reprehensible. It is, fortunately, however, a disease that wears itself out as the child grows up; and it may at all times be materially mitigated by a little care and attention, such as inducing the child to micturate before going to bed, and even awakening it before the anticipated time when it usually is attacked with the incontinence.

The last fluid meal, which should be a spare one, should be taken some hours before retiring to rest ; and if the complaint has gained much ascendancy, medicines which give tone to the bladder should be taken.

I have known the malady successfully removed, in a very short time, by a combination of the sulphate of iron and quinine ; and any sedative extract, such as henbane or hops, given in small doses in the form of Pills. Female children are more susceptible of the annoyance than males, probably owing to the shortness of the urethra. Every measure tending to give strength to the child should be used, such as cold bathing, fresh air, or a removal, especially if resident in town, to the country. Mechanical contrivances are to be had to collect the discharge of urine, whereby the offensive odour arising from the continually soiled bed linen may be avoided, and oftentimes the fretting consequences of the urine passing over the person, which induces excoriations and troublesome sores. There are contrivances for both sexes. Where the disease prevails in mid-life, it is generally traceable to early imprudent habits, and of course is the result of irritability and debility of the bladder. There are many patients who can somewhat control the functions of that organ whilst awake, but have no power over it when asleep. The treatment greatly de-

pend upon the observance of abstemiousness both in eating and drinking; a perseverance in chalybeate remedies, both taken and administered internally (I have injected the bladder of a person subject to nightly incontinence of urine with various tonic preparations, with very great and permanent relief); the use of the warm bath, whereby the skin is brought into healthier action (for it is generally arid and parched when much urine is voided, which tends to lessen the duty of the kidneys and urinary system), should be adopted; nor should exercise, that *pabulum vitæ* of even all feeble persons, be disregarded. It is of the utmost importance for the preservation of health, under all the circumstances in which we may be placed. There is a disease commonly known by the name of *Diabetes*, wherein the prominent symptom is a continual aptitude to pass urine, and in much greater quantities than the fluid consumed as ordinary drink could supply. This is one form of ailment of this class; but there is another, happily less inimical to life, and which, in the order of its frequency and simplicity, should take precedence. It is that state of health, where the patient is of that *leaky* habit, that whatever he takes runs through him, and very quickly too. Of course such a condition must depend upon a seriously deranged constitution; hence there is present a perpetual thirst, an

entire perversion of the perspiratory function, and a morbid condition of many of the phenomena of life. Where this disease springs up in early years, it becomes a habit proper to existence; and although it may not seriously disturb the economy of the being so as to lessen the duration of one's stay here, yet it furnishes a source of much solicitude, by depriving us of rest and shutting us out from society.

The patient, for such he or she may be truly called, and the complaint invades both sexes, appears to have a perpetual fever. Such is the desire for drink, that attested cases record the circumstance of individuals consuming from *one to two pailsful* of water in twenty-four hours! The urine on these occasions is aqueous, very pale, and of light specific gravity; the properties of the urine otherwise are not altered. These cases sometimes exist through life; and and if they do not terminate fatally, they ultimately enfeeble the health, and predispose the patient, or in other words, render him less able to combat with ordinary complaints common to us all, and thereby tend to the break-up of his constitution.

There are many persons tipplers not for the love of the specific liquor, but from being always thirsty; and if we reflect a little we shall soon find how inclined we are to encourage the habit. Since the introduction of tea into

this country, what inordinate quantities of that fluid are consumed by individuals. They must, of course, dispose of it after having drunk it: the stomach cannot retain it, and it escapes, either by the skin or kidneys, more usually the latter. It is no uncommon thing for nurses, washerwomen, and other females too, to swallow nine or a dozen cups of tea at a sitting: they declare it to be their best meal.

There can be no question but that we all, as a people, indulge too much in drinking fluids; and if they find not a ready exit, they necessarily debilitate the stomach, impede digestion, and provoke a train of nervous and hypochondriacal feelings that help only to fill our public and private asylums.

Man is a great deal more careful of the quadruped world than of the class he belongs to himself. He will stint his horse's drink, who works as much beyond his strength as man does under his own, whilst he, the driver, will swill till his mouth can scarcely receive another drop. The moral of a volume might doubtlessly be expressed in very few words, but then it would not be a volume, and consequently would not be purchased or read; therefore the proposition herein intended to be presented to the reader would exist unheeded. It is one thing to observe, that we all drink too much, or that too much fluid is hurtful to the digestive and other functions, the public

require some illustration (which their own reflection would furnish, if they used it), and hence this expense of verbosity to prove the fact. As one of the consequences, then, of too great an indulgence in fluids (I am here speaking of quantity rather than quality), this form of complaint, wherein the patient is perpetually desiring to urinate, is decidedly the result: and, as all complaints have a beginning, this may be considered as the first step towards setting up the several affections of the kidneys and bladder hereafter treated upon. How important, then, is the arrest of this practice. Where the inconvenience thus detailed is present, the quantity of fluids must by degrees be diminished—the general state of health must be studied. Dieting and warm-bathing are two powerful adjuncts, if properly applied. All remedies tending to afford strength to the urinary system must be had recourse to; and where the bladder loses any of its retentive power, I expect the greatest benefit from injections.

The next form of urinary disturbance of a proximate nature to the one just described, is also where the urine is discharged in large quantities; but, unlike the former, excreted in greater abundance than the supply. The character of the fluid is also different; it assumes two appearances, modifications doubtlessly owing to the constitution of the patient

and the severity and duration of the disease. It is known by the name of *Diabetes* : it is happily the least frequent complaint of urinary derangements, else, from its obstinacy and difficult management, the slightest urinary disorder would excite much just dread and apprehension.

The forms of complaint thus vary:—in the one instance there is a deficiency of the animal matter of the urine, namely, the *urea*, and in the other a superabundance of it. In the former instance, the urine is of a pale colour, and transparent, and sometimes like clear water, with a very faint, slight odour ; whereas in the latter it is generally of a higher colour and now and then so thick as to resemble brewer's porter : it is decidedly a disease of great debility. The symptoms are a wearisomeness and languor of the whole frame, a dry and crimped state of the skin, a sinking, gnawing pain at the pit of the stomach ; the bowels are obstinately bound, whilst a great thirst always prevails. The body wastes to a mere skeleton, the discharge of urine being almost constant, at least every hour, accompanied with a call that must be immediately obeyed : the leading feature in the composition of the urine, in addition to the varied presence of the *urea*, is the saccharine matter contained therein. It rarely attacks others than those who have led

an irregular life, or else have suffered much from other kinds of sicknesses.

Diabetes is supposed to depend upon a perverted action of the kidneys ; but there is little dispute of its being a malady involving the whole process of animal economisation. The quantity of urine got rid of in a day has been known to amount to *ten quarts* ; as the disease continues, the patient becomes much emaciated, the feet swell, and he sinks into a state of low hectic fever : the urine discharged continuing all this time to exceed nearly double the amount of nourishment, liquid or solid, that is taken, has given rise to the idea that water is absorbed from the atmosphere through the body. The disorder is generally lingering, and, unless conquered, is at last fatal.

Treatment
of Diabetes.

The treatment embraces many remedies : bleeding, emetics, diaphoretics, and sedatives are mostly employed. It being a complaint involving the necessity of constant professional watchfulness, a more lengthened dissertation upon its peculiarities will but little serve the patient. My own opinion is, that the invalid must look for recovery—presuming the initiatory symptoms have been duly attacked and subdued—to careful diet, fresh air, varied scenery, and cheerful society. Bathing, either vapour or warm, is immensely useful ; and, among the cases that have come under my notice (for

patients labouring under diabetes, like any other chronic ailment, generally take the round of the profession), I have seen much and great good achieved by the frequent employment of the bath.

As diabetes is mostly a sequence of some previous disturbance of the urinary system, it the more behoves the afflicted to pay attention to the first symptoms of an attack: a cup-ful of water will sometimes quench a smouldering ember which, if suffered to rise into a flame, an engine could not extinguish. I may add, there is no cause so destructive to virility as these drainages from the system through the urethra—an additional reason why they should be attended to upon their first appearance.

Cases where but a small quantity of Urine is voided, terminating in Suppression of Urine.

The most popular scientific synonyms for complaints are but little understood by men really of education; for, as yet, medical knowledge forms not one of the items of collegiate lore; and few anticipate sickness to render such acumen necessary. The term *Strangury*, from the frequency of its occurrence, is uppermost in most men's minds; and they use it on all occasions when there happens to be an interruption to the progress of making water. It is oftentimes *Strangury*. misapplied. *Strangury* implies a difficulty in voiding the urine; but it does not include those cases wherein little is voided,

because there is little to void. The affection I am now about to make mention of is of the latter description. I have stated that the urine is subject to a multitude of changes—that the human frame is constituted to exist under a variety of circumstances, and that occurrences are daily happening wherein its integrity is put to the test. Excesses, termed sensual, and others, which in themselves might destroy life, are counterbalanced by what may be styled the *safety valves* of the system. A violent fit of purging, perspiration, or micturition, is often the means of warding off an otherwise fatal blow. The skin, the bowels, and the kidneys are severally to be acted upon as emergencies demand: instance the specific operations of diet and medicines. The colour of the urine is altered by (to give a popular illustration) *rhubarb*; its odour, by *turpentine*s (taken internally, or from an inhalation of the vapour of them), and by the well-known vegetable *asparagus*; and its composition by alkaline and other chemicals. The function of cutaneous exhalation is augmented or diminished by warmth or cold; and the action of the bowels is suspended or increased by innumerable substances, forming portions of our daily food.

Analogous to these effects is the result of certain conditions of ill health. A patient, labouring under fever or inflammation of any

important organ, will scarcely rid himself of a wine-glassful of blood-coloured urine in the twenty-four hours; and there are many forms of ailments, where the function of separating the urine from the blood, or even the function of supplying the kidneys with that vital fluid, are suspended, partially or entirely. Few of us have escaped attacks of this kind; they are sure to follow long pursued habits of dissipation, or even occasional displays of it; and they are often the result of accidents over which we have but little control.

Symptoms of Strangury. A patient will complain of a frequent desire to make water;

each effort so to do will be accompanied with excruciating pain. A small quantity, or a few drops only, will dribble away, excoriating the passage as though vinegar were passing over it, and putting on an appearance almost resembling muddy port wine, or a thick solution or suspension of brick dust; there will be present much fever and constitutional disturbance. The patient may have shivering fits, pain round the loins, down the thighs, and over the lower part of the abdomen. He will betray a readiness to submit to anything, although conscious that his bladder was empty, notwithstanding the violent and urgent efforts at straining, which he is continually being called upon to make, as though his bladder were distended, and ready to burst. On

passing the catheter (I am supposing a severe case, where retention of urine has at last occurred), not a drop will flow, and the danger of the disease is thereby made apparent. Except very severe measures be adopted, which it would be idle here to lay down, the case is sure to terminate fatally. Instances are recorded where that event has been retarded for upwards of a week, during which time the patient voided not one drop of urine.

The absolute cause of the disease is very obscure; but it has a beginning, and to those only who suffer from a long-continued diminution in this natural excretion, and who disregard it, is this picture presented.

The treatment, in advanced stages of the disease, is strictly professional; but the warning of the altered character of a customary evacuation should not for a moment be disregarded.

Suppression of Urine is very different from *Retention*. In the former, there is none to excrete; in the latter its escape is impeded. In my work "on Stricture," the cause and manner of retention is explained, and the mode of relief laid down, whereby the invalid himself has a remedy at hand; but, in suppression, the resource is neither so ready nor so effectual. It is, therefore, much wiser to notice the first alteration, and to be prompt in seeking the nearest aid. Every practitioner is acquainted

with such. Although such are not ever present, even in the most extensive practice, still they do occur; and much as this mode of frightening a patient may be condemned, knowing the frequently existing disinclination to "laying up;" yet, if it only induce a fellow-mortal to take the tenth, instead of the eleventh hour, one life may be saved, and much suffering be avoided: no unimportant consideration.

This symptom constitutes a disease almost *Pain in the Back. per se.* The next circumstance that attracts the attention of a patient, after observing the turbid state of his urine, or the high colour, or the red sediment, is generally a *pain in the back*—a sense of weariness around the loins, that is much aggravated by very little exercise.

He, probably, also discovers that he is pressed to urinate more frequently than formerly, and then are ushered in all the other symptoms attendant upon the more serious forms of bladder or kidney irritation: a pain in the back may exist some time without any alarming consequences, it may, in fact, become chronic, and merely be an annoying accompaniment—it ultimately induces great debility, and there is, perhaps, no form of complaint that so harasses and depresses an individual as this worrying pain. It is difficult to say in what manner it influences the mind, but certain it is, a disordered state of the urinary organs

gives rise to Hypochondriasis, or low spirits, more speedily and permanently than, perhaps, any other in the catalogue of ills. The treatment must be directed to the restoration of the healthy secretion of urine.*

Palliatives, however, have their value—the warm bath—sedative embrocations—opiate plasters—warmth secured by leather or flannel girdles—rest, of course; occasional cupping, leeches, and counter-irritants; all stimulative drinks must be avoided, and mucilaginous ones substituted. The invalid interested on this subject will find it amply considered by cases in the Appendix and in ‘Porneiopathology.’

Under the head of this disease may be classed
 On Gravel all those urinary affections wherein
 a sandy deposit is observed, after the
 urine has stood some time. This sandy excretion varies in its composition, in the quantity voided, and in its continuance: and it is also often separated, (for it is held generally in solution in the urine) as it comes from the bladder, whilst in the bladder or in the kid-

* It is not from any affected motive, that the writer would suggest to such as may happen to submit their cases to his consideration, to bring with them a portion of the urine passed during the night, but from the fact that the extempore analysis that such should be subjected to, is more readily effected when a partial decomposition is already made, than when a secretion is more recently furnished, and all is in a state of solution.

neys ; and hence we find gravel in the kidneys, in the bladder, and in the urine. Where it is precipitated, or formed in the kidneys or bladder, it is apt to accumulate, and constitute what is called *Stone* in those organs. As I have just observed, the composition of this gravel differs, and differs also at different times in the same individual, according to circumstances. Stones have been detected, that, like the rolling snow-ball, gather up, as they increase in size, whatever comes in their way ; and, accordingly, as the deposits are principally composed of concretions, termed in chemical phraseology, *Lithates* and *Phosphates*, stones are frequently found to be formed, first of a layer of one covering, then of another, and so on.

Gravel may exist for years, without inducing much disturbance of health, or it may produce serious inconvenience in a very short time. The urine being acid, holds the salts, which it contains, in solution ; and therefore, if the acid predominate, it becomes, through its own excess, thrown down, when it is detected in the form of red sand ; but if there be an insufficiency of acid, the earths and salts of the urine are thrown down, and they exhibit their existence in the form of white gravel. Hence

Red and	the two names <i>Red</i> and <i>White Gravel</i> .
White	
Gravel.	Acidulated urine is looked upon as

certainly indicative of health, and when in

excess, of a high tone of health ; which, as the degree ascends, is marked by inflammation and fever. Alkaline urine betokens feebleness of constitution or interrupted health. High living, and an excited life, induce red gravel ; irregular, or an impoverished living, with much mental inquietude and physical exhaustion, establish white gravel. The fact of gravel being known to exist without forming stone, is no justification to suffer it to incur even the chance of such a finale. There is no class of diseases so painful and distressing, as those wherein the function of the kidneys or bladder is interrupted, and the majority of these affections are ushered in by a derangement of the urinary fluid.

The cause of gravel is owing to chemical affinities. The urine, among its other constituents, contains *Lithic Acid* and *Ammonia*, which two, in healthy urine, are combined and held in solution. If any other acid, as may be instanced in expelled urine, possessing a greater affinity for the *Ammonia* than the *Lithic Acid*, be added, the *Lithic* will be thrown down. The same process takes place when effected in the system, the source of which new acid is the stomach, which, when in an irritable and feeble state, as in indigestion, furnishes or abounds with muriatic acid. In like manner the urine containing salts, called *Phosphate of Lime* *Ammonia*, and *Magnesia*, on receiving an addi-

tional quantity of ammonia,* the *Lime*, for the less affinity to *Phosphoric Acid* than the *Ammonia* is thrown down ; and hence a salt, bearing its name, is generated, either to be expelled like gravel, or to feed a nucleus already existing in the bladder. These chemical changes are produced by the causes before enumerated. We are subject to an infinitude of laws : we are perpetually changing, and these changes may fairly be stated as chemical affinities : it is owing to such, that the absorption of fluids, and the deposition of substances, which exist more or less in all derangements of health, ensue—to such that we resist death, and to such that we become its prey. Gravel is a disease, not so productive of fear or suffering, so long as it escapes when formed : but there are so many circumstances that give rise to the formation of stone, that sandy urine should always command notice and treatment. A clot, or point of blood, that may have been discharged, from irritation of the kidney or bladder, is often found to form the nucleus of a stone : the slightest substance once in the bladder, is apt to form a basis for accumulation : a pin, a fragment of a bougie, or any instrument, hair, wood, and numberless other things that have found their way into the

* Furnished in the system by the decomposition of Urea.

bladder, have given rise to the formidable and distressing complaint of Stone.

It is not to be anticipated that every person is prone to excrete gravelly urine, Treatment of Gravel. else certain Dietetics, that evidently give rise to the same, in particular instances, had better at once be removed from the list of articles of food, and their use prohibited altogether; but there are instances where a constitutional disposition exists in particular families (that is even transmitted from generation to generation) to calculous diseases; and in those cases every precaution should be taken to avoid even their development.

The antidotes to the disposition to gravelly urine are, exercise, temperance, and the adoption of all those means that tend to promote a healthy action of the skin and kidneys, especially the warm bath. It is a perfect talisman in these affections—it needs but little eulogy;—the comfort and relief, where relief is sought, afforded on the first experiment, best bespeak its praise: it is decidedly one of the most useful adjunctive prophylactic measures we have.

I have already stated that disorders of the urine arrange themselves under two great heads—the acid, and the alkaline prevalence. The treatment is to neutralize the excess of either; the acid diathesis, as it is called, is considered a more unhealthy deviation than the alkaline, and is looked upon as indicative of greater con-

stitutional break-up. The medicines most in vogue, in *gravelly* disorders, are, turpentine (to increase the formation of lithic acid) sulphuric, nitric, and muriatic acids; whilst the antagonists to that form of the disease, wherein the above are given, consist of ammonia, potass, and soda. The great object, however, is to balance the health, to allay irritation, and tranquillise the morbid uproar of the system. Here we have an extensive field to select from in the class of sedatives. Opium, perhaps, is the best, and the most to be depended upon, its properties being best known. The warm-bath comes next; and, lastly, the various tonics and astringents of our pharmacopœia, of which *Quinine*, *Uva Ursi*, *Pareira Brava*, *Achilleæ Millefoliæ*, *Buchu*, &c., &c., stand foremost.—See, however, ‘Porneiopathology.’

Although the lithic acid deposition is the most frequent, still, as the disease advances, there is a strong tendency to the formation of the alkaline: and, as the remedies for the former are apt to accelerate the latter disorder, it is most important that the urine should undergo frequent examination, to regulate the treatment.

Recapitulation.

To recapitulate the substance of this article, it may be stated that gravel is a disease not dangerous in itself, but that it is always the forerunner, although not always productive, of stone; stone being form-

ed by the collection and chemical union of the sand itself. This collection takes place in the kidney, the ureters (the vessels that convey the urine to the bladder), the bladder, and sometimes in the urethra. The stone so formed varies in its composition and size, and is one of the saddest ills that can befall human nature. Hence the importance of watching, and attending to every urinary disturbance, of which gravel forms a prominent feature, the treatment of which has been already stated; but which, as it involves more practised judgment than a non-professional invalid can be supposed to possess, had better be entrusted only to professional hands.

On other
Morbid
Changes, in
which cer-
tain Salts
and Sub-
stances rarely
or not exist-
ing in healthy
Urine are
precipitated
or held in
Solution.

To detail the phenomena attending these changes would occupy as many pages as I have lines to devote to this part of my subject. The list alone, as recognised by the leading writers on these points, is formidable; and, as my design is briefly to reduce, or translate the scientific nomenclature of them into every-day English, I may be excused for compressing them into the smallest possible space. The importance of a thorough knowledge of every state of urine, under all the circumstances of health and illness, to a medical man is indisputable. To a patient it is less important: it is sufficient for

him to be able to distinguish, or learn, when and how far morbid urine deviates from healthy fluid. The symptoms of many of these are self-evident : by attending to them the reader will at least lose the excuse often made by invalids, of being ignorant that such changes denoted anything necessary to be attended to. Among the many publications on Urinary Complaints, the latest, and perhaps most systematic, is a work by Dr. Willis,* a highly useful library volume to a professional man.

The following summary is compressed from the work in question :—

1. Urine which contains the lithic oxide ; giving the urea in the form of an oxide, instead of an acid : it is a rarer form of the disease than the lithic acid.

2. Urine holding in solution, or depositing cystic oxide, the symptoms of which are marked by a greenish yellow colour of the urine, with a peculiar smell, like that of sweetbriar, mingled with a fetid urinous odour, the appearance also being somewhat oily.

3. Urine characterised by the presence of purpuric acid ; it is distinguished by a pinkish rose-coloured sediment. There are other conditions when the urine is variously coloured ; but the presence of purpuric acid is indicated

* " On Urinary Diseases," by Robert Willis, M. D. Sherwood and Co.

by a deposit, the other states not necessarily yielding one. Urine, with purpuric acid in abundance, is indicative of great constitutional disturbance, and affords just grounds of alarm : it has been known to give rise to calculus.

4. Urine distinguished by the presence of oxalic acid, forming chiefly oxalate of lime, and leading to the formation of renal calculi.

5. Urine containing albumen. This state may be traced to two causes ; one depending upon a positive alteration of the kidney, and accompanying a general dropsical condition of the cellular membrane ; and the other traceable to functional derangement only. The two forms of complaint are distinguished by an altered state of the other materials of the urine. In the more formidable form, where albumen prevails and accompanies dropsy, the urea of the urine is much lessened in quantity, or wholly absent ; in the other, the urinary composition is unaltered, except as being supplied extraordinarily with albumen. Albumen is discovered in the urine by being allowed to settle ; and when the urine is carefully poured off, the albumen forms a tenacious yet trembling jelly, adhering to the vessel. It is a disease prognostic of serious structural change in the kidneys, and of great constitutional derangement.

The treatment depends, not on the mere administration of a few drugs, it involves strict

attention to diet, and imposes extensive alterations in habits, situation, &c.

6. Ammoniacal urine, chiefly present in dyspeptic patients. It is always a consequence of deranged digestion: but it is also a sequence of long-retained urine in the bladder, the putrefactive process of which has commenced.

The treatment of the two is obvious. In the one, the general health must be studied: in the latter the urine must be withdrawn, and its re-accumulation prevented.

7. Urine containing the prussic and ferrocyanic acids.

The ferrocyanic acid is detected by the blue appearance of the sedimentary urine; it is attributable to the patient having taken, either medicinally or accidentally, some preparation of iron. Prussic acid is a product of the destructive distillation of animal matters, generally of blood and lithic acid in particular; and the presence of the acid in the urine is owing to its elimination from the system, through the chemical powers of the kidney.

The mention of the above occasional occurrence is more to note its singularity than importance.

8. Urine containing carbonate of lime.

9. And urine containing phosphorus. The former is a constituent of vesical and other calculi: it is rarely discovered in solution or

deposit in the urine of man, but it is observable in that of herbivorous animals: instances of the phosphoric urine are recorded, but are of rare occurrence.

The two remaining varieties are, where the colour and the odour of the urine differ from ordinary health. Urine has been met with that has ranged from the *palest citrine* to the *dingiest black*.

The cause of these changes is not satisfactorily explicable, nor do they appear to have been productive of any ill consequences. The odour of urine is traceable generally to the various articles of diet. Fevers, stomach derangements, free living, and great debility possess their influence on the colour and odour of the urine.

Urine containing some of the constituents of the Blood.

There are two prominent changes in the composition of the urine, distinguished by a milky appearance of that fluid, differing in this particular—that when the urine is suffered to stand, the deposition in one instance amounts to the consistence of jelly, and presents an oily appearance, resembling, in fact, *blanc-mange*; whereas, in the other case, a gruelly resemblance is the better designation: the latter is called *sero-albuminous*; and the former *oleo-albuminous*. They both indicate a deranged renal function, complicated with general disturbance.

The treatment must be left to the practitioner.

Of Bloody Urine. This may arise from a variety of causes—it may be owing to accident, whereby, from some cause, some minute vessel is ruptured in the kidney, bladder, or urethra : it may be owing to ulceration in one of its many stages, and to which these organs are severally liable. It is no uncommon circumstance to observe bloody urine during a clap, when there is much irritability about the neck of the bladder, or that organ itself. Sometimes it happens without any *apparent* cause : as we perceive persons, seemingly in good health, spit blood, which may escape from the lungs or stomach, or nose, simply from plethora, or preternatural fulness of the system.

In fact, urine seemingly composed wholly or in part of blood, occurs to many persons, generally once or so in their life; that is, if they are men upon town—men who scramble at all hazards through life, and who run through the perils of feasting and carousing. Depending upon so many causes, the treatment must necessarily be influenced by a suitable reference to that which gave rise to the disease. On some occasions the symptoms are slight or transitory ; on others, serious and fatal. Under all circumstances, professional or medical aid should be sought and procured.

The urine has been found to contain, some-

times, flakes of skin or membrane of the various channels through which it flows. In all cases of irritability, the urine abounds with mucus, as is perceived at the conclusion of the act of micturition, and in cases where serious inflammation exists, the mucus is changed into purulent matter. When gonorrhœal inflammation extends to the bladder, the urine assumes quite the appearance of a thick dirty gruel, occasioned by the abundance of pus; of course, when produced by the former cause, it signifies the probability of protracted and serious illness.

Different
Secretions
detected in
the Urine.

In the urine also is to be detected the ordinary secretion of the prostate gland; also the seminal fluid, which sometimes drains involuntarily and unperceived by the patient. In jaundice the urine is tinged with bile: milk, by some, is supposed now and then to form a constituent of the urinary fluid; and the author, whence these outlines are taken, quotes from authority the occasional presence of yeast. Such are the numerous vicissitudes incident to a most important outlet of the system. The necessity of carefully investigating these harbingers of human infirmity cannot be better exemplified than by remarking, that many of these states are indicative of a sudden and afflicting termination to existence, which a timely observance might prevent, and thereby prolong life to its average period. To such of my readers as

may be incipient sufferers, these pages may, even though they should render the possessor nervous by perusal, at least be the means of giving timely notice, whereby the dreaded denouement may be averted. To others, who, from curiosity or accident, may glance over them, they may convey a hint that, some time or another, may be similarly serviceable; and to those sorrowing under some of the more serious calamities detailed, the consolation of knowing, that despair is not among the category of the practitioners of the science of surgery and medicine.

ON ANIMAL CHEMISTRY.

BY PROFESSOR LIEBIG.

Its application to Disorders of the Urine.

To the British Association, which assembled in Glasgow in 1840, are we indebted for the publicity which has followed Dr Liebig's views of Animal Chemistry. Views which, if correct, every medical man, here or elsewhere, must sooner or later adopt. Views which will alter entirely the present aspect of medical science; and when thoroughly appreciated and followed out, will at once remove that stigma from our profession, that it is a conjectural science.

The profession are already deeply indebted to Dr. Gregory, of the University of Aberdeen, for his able translation of Dr. Liebig's work.* Other gentlemen have followed in the wake, and have assisted to popularize the author's ideas. Some highly interesting and explanatory papers have appeared in the "Lancet," edited by Henry Ansell, Esq., surgeon, of London, which no one can read without being impressed with the plausibility of Dr. Liebig's novel propositions. The application of these views has also been practically extended by H. Bence Jones, Esq., M.A. who has published a work entitled, "On Gravel, Calculus, and Gout,"* wherein an exposition is given of those chemical changes which produce the diseases in question: and inferences are drawn, not only of what should constitute the treatment, but the *modus operandi* of the remedies suggested. In a work treating upon urinary disorders, although intended for popular reading, it would manifest great remissness, and probably, even in these early days, act to the prejudice of the author of this little publication, if no notice were taken of the subject, for no other construction could be drawn than ignorance or prejudice. In the present paper, I purpose chiefly to consider those facts which relate to the formation and changes of the urinary fluid; a summary, however, of Liebig's

* Taylor and Walton, Upper Gower Street.

doctrine is previously necessary for the intelligibility of them.

Liebig holds the preservation of animal life ^{Theory of life.} to be dependent upon chemical processes. He admits the existence of a *vis vitæ*, which force permits and promotes the changes that follow. It is popularly known that all organised substances are reducible to elementary principles, and that these elements are chiefly *oxygen, hydrogen, carbon, and nitrogen*. If these terms are unintelligible to the reader, any of the initiatory works on chemistry will explain them. Few persons, however, are entirely ignorant of these elements by name, and most have seen them practically illustrated in the lecture rooms of our reading associations and scientific institutions.

Elementary substances are those beyond which analysis cannot extend. Formerly they were considered as few, namely, earth, air, fire, and water; now these are found to be severally divisible, and numerous other elements have been discovered. Organic bodies are reducible into elements, among which, and to our present purpose, we may consider the different structures of our bodies. In human life these structures are continually wearing away, and require replenishing. Liebig particularises how these processes are effected. We all know we must eat, drink, breathe, move and sleep; but we can readily become enlightened why these functions

must be fulfilled, and the effects which must follow, by studying the animal chemistry of Liebig, and which we could not satisfactorily understand, or have explained before, without it. His theory of the continuance of life is, that it depends upon the supply and forced assimilation of elements, of which the body, in which life abides, consists. For instance, life is considered as inhabiting animals and vegetables. Vegetables subsist on earth, air, and water, and their compounds. These compounds contain the elements which are inherited by the vegetable kingdom. Animals who live on vegetables, amalgamate to themselves the elements of the motionless life on which they themselves subsist; and in the order of progression, animals who live upon animals, sustain themselves by the elements which correspond with the principles of their own structures. To simplify the position, and descend in the order reversed, blood furnishes blood, muscle forms muscle, substances analogous in elementary composition repair the waste of nerves, brain, &c., and hence have we also sources from which bone, cartilage, membrane, and skin are derived. The crucibles, if the digestive organs of the animal and vegetable kind may be so called, possess the power of receiving and separating the substances at hand. The digestive powers of all organic sub-

differ in property and arrangement.

Although a plant may supply an animal with food, and that animal may furnish another in the order of superiority with the elements of the succeeding composition, and so on, until the perfection of animal organisation is attained as in man, still man cannot wholly subsist on green herbage and water, any more than he can live wholly upon flesh and blood, that is to say, in a state of health. He requires a greater amount of elements than the vegetable kingdom can afford, and also that the elements belonging to the animal species which he consumes should be diluted. The link, however, in the chain is not broken; for man in his turn supplies from his own putrefaction, when he himself shall be lifeless, the very elements that support vegetative life, that in its turn helps to maintain the animal race.

The reader will receive patiently the attempted explanation of the circle of life, which, although he may have supposed and known before, yet the detailed minutiae of Liebig's views, in fact the pith, is not so readily intelligible except the student previously understand chemistry and physiology. However, to simplify it as much as possible, and render clear to the reader the applicability of Liebig's theory to the treatment of diseases, another fact or two must be mentioned. The process of digestion, according to Liebig, is purely a chemical one, by fermentation, and not by

any specific property of the muscular movements of the stomach, or the secretion of its gastric juice. They are essential to the process, inasmuch as they are motive powers. Their functions form a part of the *vis vitæ*.

Animal Heat. The warmth of the body is stated to depend upon internal combustion, produced by the combination of the oxygen of the atmosphere (received in respiration, or by inhalation), with the carbonised and hydrogenised portions of the blood, and which has been abstracted from the nourishment which went to form the blood. The union of these gases, let it take place where it will, evolves heat. Internal combustion, then, is ever more or less going on in the ratio of the supply of its elements. Blood is generated from food, the circulation of which is promoted by motion. Hence food and exercise; the former from conveying the elements, that meeting with the oxygen received by the lungs, &c. gives forth heat; and the latter, that promotes respiration, and accordingly seeks for more oxygen, and so increases the heat; hence, I repeat, food and exercise furnish and preserve the temperature of the body. The body, like any other conductor, has a tendency to amalgamate with the surrounding temperature, but its own heat is acquired only by the chemical processes before named. Heat increases or diminishes with the quantity of oxygen respired. The

quicker the respirations, the higher the temperature of the body. The slower, the less heat is generated. By this constant generation of heat, a perpetual change is going on in the system. All substances, not consumed, are given off in the excrements. The change effected by the evolution of heat, is the generation of carbonic acid gas, and water. The former escapes by expiration from the lungs, and the latter by the secretions of the body. Thus we live—atoms take the place of atoms. The *vis vitæ* defines the animal, which is maintained only so long as heat is generated in fitting proportions. Heat provokes the chemical changes that sustain the *vis vitæ*, and hence the phenomena of life.

Although this theory may falsify former notions of the laws of animal existence, its tendency is not to upset that which experience has established. We have hitherto been right in our conjectures of many of the changes which ensue, but we were not clear how those changes were effected. A better understanding of Liebig's propositions sets all doubt at rest. With these prefatory remarks, and a summary of the formation and disposal of the bile, the source and creation of the urine will be more easily understood.

Formation
and Property
of Bile.

Animal heat, it has been stated, is attributable to the oxygen, which is carried to the most minute part of the

body by the arteries, oxydising the elements it comes in contact with, and thereby producing combustion. The result of this combustion is the generation of carbon. During respiration, a great portion of carbonic acid is given off as we empty the lungs, in exchange for the oxygen received by inhalation, the chemical composition which takes place in the lungs by their immediate contact with the air; but the 'carbon generated by this said combustion in the inner structures of the body, such as in the tissues, fibres, &c., is carried forward with the circulation, and eventually filtered, as it were, by the liver, in the form of bile, which bile amalgamates with the chyme, and again enters the circulation; and in its further passage through the lungs, is exhaled in the form of carbonic acid. The nitrogenised

Constituents of Urine. compounds of the body are filtered through the kidneys, the kidneys being supplied by arterial blood. Thus the wastes of the body, that is to say, the old structures which give place to the new, independent of the rectal evacuations,* are carried off, when no further support or nourishment can be extracted from them, by the bile and the kidneys. It is the opinion of Liebig, that the

* I am here attempting only to explain how the "wear and tear" of the body (not the fæces, and other similar excrementitious evacuations) is carried off, and by what means it is repaired.

bile is more an excrementitious fluid, than that it serves for any of the purposes of nutrition; consequently the component parts of the urine and bile are complementary to each other. Added together, they contain the elements of the organised tissues; in other words, they are analogous to the blood itself. "The cast off materials of the vital tissues are thus divided between the urine on the one hand, and the bile on the other," so that, in table-talk phraseology, we are all burning to death. Life is a continual struggle to support and resist combustion. Were it not for the supply of food, and the principle called vital force; which is the result of the combinations which make man, the body would be consumed, as it is in death. Liebig's theory of disease is founded upon the application of this principle. He defines disease to be a preponderance or diminution of the combustible agents. When in excess, we have fever; when, on the other hand, congestions and debility. These notions are detailed in minutiae; and hence arrive we at the peculiar features of changes which take place in unhealthy urine. It has been stated in the earlier pages, that there arise two prominent conditions of urine in disordered health. The one, where there is a prevalence of acidity; the other, the preponderance of an alkali. The former is called the uric or lithic acid diathesis;

the other the phosphate or alkaline diathesis. Not to aim at an unnecessarily and apparently would-be-learned explanation, I will briefly describe what is meant by chemists as the uric acid diathesis; for although invalids may possibly only have been accustomed to have merely the inquiries put to them, as to whether their urine was high-coloured, or pale, and muddy, or clear, and which is also all that they have noticed themselves, still a medical man would glean but little useful information, if he were governed only by those signs. It has been stated, that the principal animal product On Urea. of the urine is urea. Urea is only discoverable by chemical analysis. In proportion to the amount of oxygen present in the system, the formation of that urea is checked or furnished. Where it is in excess (the oxygen) *uric acid* is produced. Other states of body have a like influence. Cold, and much exertion, predispose to its formation; much oxygen and indolence create *urea*. Accordingly, also to the decomposition of the body, are other products formed therefrom. Thus have we uric acid in combination with other salts. These combinations indicate the amount and the locality of the destructive processes going on, so that, although acid or alkaline urine, with a red or white deposit, may not immediately harass the patient by pain in passing the same, or excite his or her attention

in any other way than by its appearance, it is at all times a symptom important to be noticed, for sooner or later some other marked disturbance will be sure to follow; and, besides, in all disorders which prevail, an alteration of the urine is ever present; the analysis, therefore, of the urine, unveils the mystery, and explains the cause of the disease.

The Uric
Acid Dia-
thesis.

The uric acid diathesis, or what is called red gravel, indicates general febrile excitement, and also that a great consumption is going on of some of the important structures of the body, especially such as are termed the albuminous and gelatinous tissues. The irregularity thus established, leads to others, and sooner or later, the structures which serve as the conduits of the urine, namely, the kidney, ureters, and bladder, participate in the alteration. The functions common to each become deranged, and local inflammation supervenes. The sediment observable in urine, abounding with uric acid, consists of a fine powder, which, upon inspection, may present the appearance of small crystals of various forms, or masses of the same. When it exists, as the former, alone, and renders the water thick, muddy, or milky, it is found to consist of *urate of ammonia*, and *phosphate of lime*, with *phosphate of ammonia* and *magnesia*. Where it assumes the form of crystals, it consists of *uric acid*, *oxalate of lime*,

and phosphate of ammonia and magnesia. The colour of the deposit depends upon the colouring matter in the blood, which is generally higher or darker in this state than any other. Urinary concretions, when obtained pure, are perfectly white.

The Phosphatic Diathesis.

This condition is the reverse of the former. The uric acid diathesis arises from the prevalence of uric acid, or its compounds in the urine; the phosphatic from the presence and over quantity of the phosphates. This condition may arise from two causes: one the decomposition in the system; the other from the change effected in the bladder, when that viscus is in a state of disease, wherein the chemical action may take place. The sediment is of a white colour, and occasionally a layer of crystals may be observed floating on the surface of the water, that when brought in contact with the reflection of a bright light, "presents a varied play of the prismatic colours."

It may surprise non-professional persons, to be told that they contain in their bodies such substances as *phosphorus*, *sulphur*, *lime*, and *magnesia*, but analysis readily establishes the fact. These substances are conveyed into the circulation of man and the animal kind, in their diet and drink. The elements of nutrition in the animal and vegetable kingdom are alike, and each part

of the animal system takes to itself that part of the vegetable which is analogous to its own elementary structure, and *sulphur, phosphorus, and phosphate of lime*, abound in both. It is important to bear this in mind, "that in vegetables we find organic acids combined with *lime and magnesia*, and in them *phosphates, carbonates, sulphates, or chlorides of lime and magnesia*, are universally present.

"Phosphoric acid has been found in the ashes of all plants hitherto examined, and always in combination with alkalies, and alkaline earths." All plants obtain their phosphoric acid from the soil. Most spring water contains lime in some form or another. In a table presented by Liebig of various substances as containing the phosphates, it appears that beef, potatoes, bread, milk, wheat, blood, and wine, severally possess more or less of them. When only a sufficiency is present for the necessary support of the bones, brain, and membranes, none appears in the urine; but when it prevails in excess, it is given off by the urine. Some animals retain the excess in particular reservoirs, as, for instance, the stag, whose antlers are derived from it.

The indispensableness of lime to pigeons is well known, as they cannot live long without it. By confining their diet to wheat they soon die, and their bones, after death, have been discovered to have dwindled away, and to hav

become perforated with holes. The phosphatic salts also are created in the body by the oxydising process continually going on, by which the phosphorus in the albumen is converted into phosphoric acid. Exercise and animal food tend to accumulate oxygen, and a greater portion of the phosphates are created, which are given off by the urine. Where phosphorus is deficient, the salts are usually combined with carbonic acid. Mucus membranes secrete the phosphates in the form of phosphate of lime. The tartar on the teeth consists of 79 per cent. of phosphate of lime. Phosphate of lime is always present in the urine that is voided in irritable bladder. It may not immediately be thrown down, but in proportion to the irritability present, so soon, after exposure to the air, is it precipitated. The urine is found to be alkaline, in conditions of great debility.

TREATMENT OF RED AND WHITE GRAVEL.

I am candid to confess, that after perusing what I have written, it does not appear to possess that popular interest which it was my aim it should, and in the absence of the necessary foreknowledge of chemistry and physiology, it may be an irksome chapter for a non-profes-

sional reader to go through. However, my Hand Book on Indigestion will help to unravel it. The chief purport of this paper is to explain the two prominent conditions of urine, that are not only present in disorders of the urinary organs, but also more or less in all disturbances of health. It will, therefore, appear that there is always more or less acidity present in the urine. Its production depends upon chemical operations, over which we have, and over which we have not, controul, and those operations are diet, fresh air, and exercise. The plausibility of this proposition may be seen at once, by recollecting, even in health, the different appearances of our urine at different times in the day. The urine of the morning may be called the urine of the blood, that in mid-day of our drink, that at night of our food. In the morning, it is higher coloured, and of greater specific gravity; in the day, it is pale and plenteous, and of light weight; and at night it partakes of the character of what we have eaten.

**Treatment of
Red Gravel.**

In red gravel, there is a deficiency of oxygen and an abundance of uric acid. The first effort should be to increase the one and diminish the other. Exercise, by increasing respiration, provokes the absorption of more oxygen; also by inducing perspiration, which carries off acidity with it, lessens the quantity given off by the urine.

On sleeping. Too much sleep is objectionable, the respiration being slower, and the air of a close room soon becomes deteriorated; therefore the bed should not be encompassed by furniture. It is very unwholesome to bury the head beneath the clothes, a practice chilly people often fall into. Rooms lighted with gas, and ill ventilated, are most injurious to breathe. If the weather forbid out door exercise, walking about large rooms and passages with the windows open, is the best alternative. There can be no doubt of the advantages of country over town air.

On Diet. A grand desideratum is the proper selection of food and drink. Food containing no *nitrogen* combines the sooner with oxygen, and hinders its action on the uric acid, and hence nitrogenised food is the most proper to prefer. Consequently meat, with little bread and less vegetables, should constitute the diet of a person suffering from excess of *uric acid*. But then again, to assist the process of respiration, non-nitrogenised food is essential. The two functions must be attended to, and their regulation must be guided by observation, and the patient's own experience. As a general principle, non-nitrogenised food must be taken sparingly. Sugar and starch are of the last named quality, consequently all those substances abounding in them are injurious in excess. Thus potatoes and rice are inadmissible, and

more objectionable than greens or peas, which contain more nitrogen. Apples and pears, from containing starch and sugar, are hurtful. Fat and butter are objectionable. In the *Hand Book on indigestion* is to be found a selection of the most appropriate diet for invalids.

On Drink. As to drinks, pure water is decidedly the best. Other waters possess medicinal properties, such as the oxygenated water, lately introduced into this country, and sold at the chemists. Seltzer* water is a valuable drink, and mixed with hot milk, forms a good substitute for tea and coffee. These admonitions may appear trivial to a person suffering from affections of the urinary organs; especially if acute, but they are intended as guidances chiefly for those who have a disposition to secrete gravelly urine; for it must not be forgotten that the most formidable of all diseases, which is stone in the bladder, takes its origin from gravelly urine (see my book called *Por-niopathology*).

On Medicines. With regard to the medicines which have a tendency to neutralize acidity, and to absorb oxygen, the most useful are alkalies, and the various preparations of iron. Their administration must be left to the medical man. Other medicines, such as aperients, have their value, especially when we know, and

* Axman, 4, Mark Lane.

which now by Liebig's theory we do, their *modus operandi*. They carry off the non-nitrogenised properties of the blood.

On Warm Bathing. The next, and an invaluable agent it is, is the bath. The efficacy of warm bathing in urinary affections is proverbial, but when it is told that also by its means, certain medicaments can be thrown into the system, it is invaluable. Warm baths can be impregnated with alkalies; and when it is known that even immersing the feet in a solution of acetate of potass will render the urine alkaline, how important must be its utility when the entire body is immersed in a solution of the same, or any other advised alkali? Dr. Jones, the author of the work on Gravel and Gout already alluded to, suggests the use first of the vapour bath, to remove the water and acid substances of the blood, and then an alkaline bath, to infuse the alkali into the system.

Cold Bathing. Cold bathing also has its efficacy in urinary derangements. Liebig says, "Let us suppose that heat is abstracted from the whole surface of the body; in such case the whole action of the oxygen will be directed to the skin, and in a short time the change of matter must increase throughout the body." The application of the Douche Bidet, and the Douche shower, are incontestably useful in these cases.

These general remarks upon the treatment

of the uric acid diathesis, are intended to apply to the regulation of every-day diet; and the object is not so much to clear the urine, as it is to guard against a greater calamity; namely, the formation of stone: for it must be remembered, that although we do not hear of so many suffering under that distressing disorder as there are persons afflicted with gravel, yet sandy urine is the precursor of stone in the bladder. And again, sandy urine indicates other apprehensions, for it is present in most inflammatory complaints, and always is the forerunner or accompaniment of affections of the urinary organs. Indeed, oftentimes the precipitation only takes place in the kidneys and bladder, which is owing to the altered state of the mucous membranes of those structures secreting their own deposition. When inflammation is present, other means than meat and nitrogenous diet, fresh air and exercise are needed. The order, in fact, is to be reversed. Blood-letting, rest, purgatives, sedatives, fomentations, and non-nitrogenous food must be substituted, to subdue action of a more mischievous kind—the excitable condition of the *vis vitæ*—lest the fabric get clogged up, and its operation become suspended altogether. The *uric acid diathesis* is a forerunner of gout, which is a diversion of the *lateritious* deposit. Gout always indicates a want of oxygen, and is generally brought on by free

living and sloth. When it is remembered that the readiest way to procure a fresh supply of oxygen, and also to disperse the chemical collections of the body, is by exercise, exercise will stand higher in public estimation than before these views were divulged. The old physicians used to recommend spare living and plenty of walking as the cure for gout, and many country people rely upon those means alone, but without knowing why and wherefore it is so serviceable. As a summary, the remedy for red gravel, when unattended with any other sensible disturbance, is meat diet, mild liquids, fresh air, and plenty of exercise.

TREATMENT OF THE ALKALINE DIATHESIS.

This consists of impregnating the blood with more acid, in order to retain the alkali in solution; for which purpose the vegetable acids are recommended, as tartaric, citric, and acetic. The supply of those dietetic substances, containing the phosphates, particularly bread and potatoes, must be replaced by peas, beans and rice. The phosphatic Diathesis is present in scurvy, which arises from too long continued salt and unwholesome diet. Here more oxygen is wanted, and fresh air, and exercise suited to the strength of the individual.

The appearance of phosphatic urine is an

indication generally of great debility. Other remedies, suitable to the case, must be administered, with a view to regain strength. Warm and cold bathing possess their advantages.

In concluding this brief outline of the views of professor Liebig, which have created so great a sensation in the medical world, I am aware I have but very imperfectly conveyed even a sufficiency of their purport to be understood by the general reader, but possibly that little may create curiosity enough to induce an insight into the original. A man may understand what he cannot readily explain: it may be my case, but I am persuaded that a new era in medical science is approaching, and when the nature of diet is better understood, many new substances will be in request, and many old ones thrown aside.

It would be achieving a great thing indeed, if adulteration of the good things of this world could be prevented. I suppose there is scarcely an article of diet or drink that is as pure as its name would imply. From milk to beer, and from meat to bread, there are very many grades of difference. One can forgive a cheat in a fabric, but it is unpardonable in the nourishment of man.

In nearly all complaints of the urinary organs, more or less pain or inconvenience is usually present. There is generally an uneasy

sensation in the back, giving a feeling of languor, great weakness, or positive pain rendering it difficult to stand erect, or to walk, or the pain comes on upon the least exertion. There is also more or less pain present in the bladder, either in the front or lower part of the abdomen, or it may be deeply seated, and appear to exist about the neck of the bladder.

Another feature in urinary disturbances is heat, or a sense of excoriation in micturition, with a frequent pressing desire to urinate, also with great straining, when little or much may be voided, and which act is followed by an intense numbing pain, diffusing itself to the rectum and parts connected therewith.

The last and generally most important, is the varied states of the urinary fluid. The most observed symptom being pain, and that situated in the loins and bladder, I shall introduce a few cases illustrative of these latter conditions and their causes; and then briefly explain the treatment usually found to be successful.

I have elsewhere stated, that irritability is defined to be an overaction of a part, or more particularly of its functions. It consists of too great sensitiveness, occasioning the particular structure to disregard the controul of the will, or its relation to other functions. Irritability soon leads on to inflammation, if not subdued, when many of the morbid changes, hereafter to be exhibited, take place, and embitter the life

of the invalid so circumstanced. In a more voluminous work, but one written for the exclusive reading of those it more nearly concerns, the unfortunate contractors of specific disorders, and entitled "Porneiopathology," also my Hand Book upon Diseases of the Urethra, &c., cases are given and drawings presented of the common results of infection, including especially those sad accompaniments to bladder complaints, namely, morbid conditions of the prostate gland; therefore the facts related herein are confined to those derangements of the bladder and urinary organs more particularly, as coming under the denomination of medical rather than surgical cases. The reader, therefore, who may not find what he seeks in this little volume, may acquire the requisite information in either of the others.

CASES.

CASE I.—IRRITABLE BLADDER.

The patient was a gentleman (aged thirty-nine). The account he gave of himself was as follows:—During the past month (Jan. 184—), he had been to several public dinners, and had partaken freely of champagne, and had con-

cluded the evening with hot brandy and water. On a late occasion, he walked home to the city from Greenwich, and on the road he stopped with some companions to refresh himself with more brandy and water. The quality of the beverage was questionable. The night was an unfavourable one, a drizzling rain falling the whole time of his walk; and although he considered himself well protected by a thick modern great coat, he got completely soaked through. Upon arriving at home, he went to bed, but passed what few hours he had to spare most restlessly. He complained of being unable to get warm, and early in the morning he came on to Broad Street for a hot bath. This somewhat relieved him, but he was seized during the day with shivering, a frequent desire to make water, and a severe pain in the loins. The urine secreted was small in quantity, high coloured and thick. In the course of the evening he became worse, and sent for me. The treatment was prompt and successful. He took a small dose of castor oil, which relieved the bowels freely. A mucilaginous sedative mixture was prescribed, which was taken every six hours. Bed-rest, abstinence, mild fluids, and occasional purgatives, restored him in a few days.

Why this case is denominated irritable bladder, is, that according to his statement, on every occasion of his drinking a little freely, he had been troubled with a pressing and frequent

inclination to micturate, that only subsided as he confined his drink to slops, or toast and water. The relief was as effectual in this instance. The pain in the loins left as this irritability of the bladder was quieted. The inference was, that when under the influence of stimulative diuretics, the mucous membrane of the bladder became suddenly sensitive, the muscular contractions were sympathetically excited, and from the general disturbance present, fever ensued, and the symptoms as narrated followed.

Drinking champagne and brandy-and-water after a sumptuous dinner, it may be said, is enough to provoke the urinary organs of any person; but numbers can do the same with impunity, and escape scot free. Some drinks even of a milder nature will harass many persons, by exciting frequent micturition. Sherry, a few glasses only, claret, any foreign light wine, sometimes cold water will create a bladder disturbance. Much also depends upon the state of the stomach. A greater portion of drink can be borne with a substantial meal, than upon an empty stomach; a bottle of wine in the former instance producing no inconvenience, whereas one or two glasses only before dinner will occasion a vexatious leakage for several hours.

Many kinds of diet possess a similar property with some people. Persons of such predispo-

sitions, should avoid ale, cider, gin, whiskey, Hollands, and those liquids which their own experience has painfully attested. There is no immediate remedy like the warm bath, and if one is not to be obtained in the apartment, or an establishment be not handy, the next alternative is warm fomentations, made by wringing flannels, previously dipped in hot water, and applying them over the lower part of the abdomen and the perineum: mild purgatives, sedatives and rest generally complete the cure.

The case submitted above is one of ordinary occurrence, and often befalls men much given to society. It is, however, a complaint that, if neglected, also creates spasmodic stricture and retention of urine.

CASE II.—IRRITABLE BLADDER.

Irritable bladder is a most frequent attendant upon a disordered state of the urine, and is generally consequent upon it; still the urine may be, and is, in a corrupted state, without a participation of disturbance in the bladder. Irritable bladder often ensues from cold as well as from the causes detailed in the last case. It is highly essential the real cause should be ascertained. Another affection of the bladder, is a nervous state of irritability, which, if not always more or less present, is easily in-

duced by the slightest change of temperature, of diet, or upon the occurrence of any mental inquietude. These cases are very distressing as they exclude the sufferer from going into company, or visiting any place of public assemblage.

These cases are also more prevalent at the most interesting period of life, and particularly distressing where the object is a female. The desire to micturate comes on so suddenly and so pressingly, that the greatest inconvenience follows, especially if it occur in a crowded place, or in a public street. The attempt to retain the urine gives rise to a sympathetic desire to relieve the bowels, which becomes as difficult to controul as the former, and the greatest possible personal discomfiture is produced.

The case which the preceding remarks introduce, was one of a corresponding nature. The party was twenty-three years of age, and had been subject at intervals to attacks of the kind for the last four or five years. The general health was much disordered, the most important feature being exceedingly irregular menstruation. That latter function was eventually restored to a healthy occurrence. Change of air, cold sea-bathing, chalybeate mineral waters, and a cautious diet completed the cure.

CASE III.—IRRITABLE BLADDER,
With Pain in the Loins, and Hemorrhagic Urine.

In the narration of cases herein offered, the selection is confined principally to such as may be called medical, or those which are occasioned by cold, fatigue, indigestion, constitutional, or other causes dependent upon a general disturbance of the health. Numerous cases occur that owe their origin to neighbouring diseases, and to alterations of contiguous structures, such as those occasioned by Urethritis, Hernia Humoralis, Syphilis, and Stricture; but as many such instances are given in my publications, "*Porneiopathology*," and the *Hand Book of Diseases of the Urethra*, their omission in this little work is to spare the multiplication of evils. The works in question can easily be referred to.

The affection I have to speak of under the present heading, happened to a gentleman about twenty-eight years of age, of a sanguine temperament, of delicate configuration, and of feeble health. His pursuits took him much from home, being accustomed to drive about in a gig from thirty to forty miles nearly every day. He was of temperate habits, in their fullest acceptation, and had little other mental anxiety (the world smiling prosperously upon him) than the frequency of calls for micturition. He was certainly out in all weathers, and occa-

sionally irregular in his hours of dining, and getting home to his family, being obliged to be absent now and then for several nights together, and having to sleep at road side inns. His annoyance consisted of being compelled to attend to urgent calls to pass urine. Sometimes he would endure the feelings, and await his arrival at the end of one of his stages, when, to his mortification, he would find himself unable to micturate a drop. He would then be obliged to procure some warm tea, or to warm himself, if it so happened, before the kitchen fire, and to wait patiently until he could relieve himself. On these occasions, he would pass several streaks of blood, and the flow of urine would be suddenly checked by a small clot of blood blocking up the urethra. This would occasion for the moment great pain around the neck of the bladder, and the desire to micturate would be most pressing and painful. Upon the escape of the obstruction, he would be enabled to complete the act, but only within perhaps half an other hour to be re-excited to perform it over again.

He was seldom or ever free from a pain in the back. Occasionally the urine would be thick, and deposit a sediment of a white sandy appearance: at other times it would be pale and thin, and flow from him with less inconvenience. He had been thus incommoded for many months past. He recollected having had

a similar attack two or three years ago; but it got well of its own accord. He found pressure to his back give relief, to afford which he had a large padded board affixed to the hind part of the seat of his chaise. Warmth was also comfortable to him, and he wore a leather belt, besides a double roller of flannel. He had consulted several men, but he had been an inconstant patient, abhorring physic. His diet was chiefly composed of meat, bread, tea, and about a pint of beer daily. He never took wine or spirits, but he could not dispense with his malt, as he considered it necessary to support his strength. The pain in his back was sometimes so severe, that he could scarcely stand upright, and the slightest twist or false step increased his agony. He could, strange to say, generally pass the night without disturbance. The case was one evidently of muscular rheumatism of the whole urinary apparatus, accompanied with much nervous and muscular irritability.

The treatment, for in this instance he was persevering, his torment inducing him to submit to whatever was proposed, consisted of the application of dry cupping, now for novelty's sake termed traction, an old woman's remedy to this day, but not the less useful although not new, and a remedy which, in my Galen days, was an antidote to lumbago, so familiar and certain, that in a workhouse which the gentleman under whose roof I became instructed in the

first rudiments of the profession, attended, the paupers were supplied with glasses, and the nurses instructed how to use them. This dry cupping consisted of applying the glasses over the region of the kidneys, and gently carrying them (the glasses) in a circular direction around the loins.

The operation is not painful, but requires some little practice to do it dexterously. It leaves a slight tenderness, but is eminently useful as a counter-irritant. This ceremony was repeated on alternate days. The application of a douche shower,* directed against the loins, was also practised for two or three minutes every morning and evening. Beer was ordered to be discontinued, and Seltzer water substituted, as well as for breakfast, mixing it with hot milk for the last-named meal. The bowels were kept open by mild saline aperients, and chalybeates were prescribed with the greatest success. This case in a few weeks terminated happily in his perfect recovery.

CASE IV.—IRRITABILITY OF THE BLADDER,

With Fever, and the deposition of sandy Urine.

The gentleman to whom the following event happened, was engaged in the city daily, and

* The Douche shower, as well as the Douche Bidet, deserve much commendation. The former consists of a reser-

usually walked home of an evening to his residence, about four miles from town. For some weeks previously to the occurrence about to be narrated, he had been troubled with a distressing languid pain in the back, that used to come on when about half way home, and he generally

FIGURE IX.

voir, capable of containing a gallon of water, at the lower part of which is a tube, at the end of which is affixed a rose, like that of a watering-pot, perforated with very small holes. A tap regulates the shower of the water, which is directed against the part desired to be operated upon. The sensation is highly pleasurable and refreshing, and particularly serviceable in all such cases wherein a stream of cold water would be ordered, or the cold shower bath be prescribed.

The Douche Bidet is preeminently useful as a tonic in debility of the urinary and rectal organs. See annexed diagrams, as above.

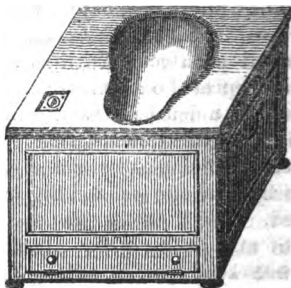
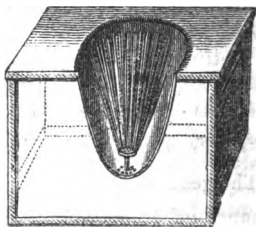


FIGURE X.



was obliged to stop and micturate several times during his walk. His urine of a morning was more frequently thick and muddy, except after taking brandy and water the over night, when it would be clear, and of a proper colour. He was what is called a beer drinker, usually taking a pint with his dinner, and the same at supper. He was otherwise a cautious man in what he ate or drank. Now and then only he would keep late hours, and do as other people did—partake of whatever was offered to him. About two days antecedent to the attack I am about to mention, he got wet. He was riding in an open phaeton with some friends, and took shelter in a country ale-house. The only beverage he could get was some old ale. The same evening his friends made merry, and he joined in the general drink, which was punch. The following morning, he was much harassed with a fretting desire to pass water, and at the end of the third or fourth attempt, he found he could pass none.

Getting alarmed, he went home, took some castor oil, and retired to bed. The desire to micturate continued, and came on with a straining every quarter of an hour, when a few drops only would escape. In the evening, the bowels were relieved, as was also his uneasiness. He supped off gruel, and passed a restless night. The following morning I saw him. Not having voided half-a-pint of urine, the abdomen ap-

pearing distended, and the desire to urinate having recurred (merely the desire without the ability), I passed a full sized catheter, and drew off, to his great satisfaction and relief, nearly two pints of offensive and highly coloured urine. He complained of great uneasiness and weight in the perinæum. He had a foul tongue, and a quick and full pulse. Leeches were applied to the perineum, followed by hot poultices. The castor oil was repeated, and sedatives and mucilaginous drinks were given. The case occupied nearly a fortnight before he got well. The treatment persisted in was similar to that of the first day. The water was drawn off several times; leeches again applied; the hip hot bath was advised twice daily, and bed-rest, with total abstinence insisted upon. At the expiration of twenty-one days from the date of his laying up, he was again at his usual occupation. He preserves his health by confining his drink chiefly to the mildest liquids, such as Seltzer-water and milk, taking but sparingly of tea, and quenching thirst by barley or toast-and-water. He is also careful in the selection of his food, avoiding feasts, dinner parties, suppers and late hours.

A medical reader would consider the title of this case a misnomer; as, from the severity and duration of the symptoms, inflammation was evidently present, and extended not only over the mucous membrane, but involved the pros-

tate gland, and also deranged the whole economy of the bladder. Such was certainly the true nature of the disease; but it originated from an aggravation of the chronic irritability that had been previously so long annoying him, and which, had he attended to it in the first instance, the sequence might have been prevented. Morbid irritability, whether of the bladder or any other viscus, if neglected, necessarily is liable to be followed by partial or general inflammation upon any provocation; and as the leading feature of his case was as it is entitled, the cognomen is preserved.

PAIN IN THE BACK.

I can best illustrate this affection by the narration of a case. A gentleman, four and twenty years of age, accustomed to out-door occupation, and consequently exposed to all weathers, complained of a continued worrying pain in the back. He had been annoyed by it for several months; occasionally it would be better, and at other times insupportable. The pain was situated at the "bend of the back." Exercise relieved him. He suffered most when sitting down. He was easy in bed. He did

not discover any alteration in his urine, nor was he troubled with a frequency of passing water. He was well built, robust, and not corpulent. He considered it to be rheumatism. He had worn a "poor man's plaister," which he at first thought relieved him, but of late the pains had increased. He had dieted himself, and had given up drinking porter. The continuance of the complaint much vexed him, and lessened his strength. Pressure rather relieved him, and he thought he derived some benefit from wearing a leather belt.

In this position he became my patient. Many such cases frequently fall under the notice of the medical man, and many also are borne and worn out, without resorting to medicine. Some invalids will seek relief by being cupped, which will now and then prove successful. Others will procure embrocations, or take hot and vapour baths. Such cases as are decidedly muscular rheumatism, are oftentimes speedily curable by any of these remedies, whilst as many more defy them. It would be empirical to suggest cupping, blistering, or bathing at random. Every case requires its own particular treatment, but I can speak in the highest terms of a species of counter-irritation, that, where no fever or excitement is present, nor any disturbance of the kidneys exists, will relieve the affection in a surprisingly

short time, and that is dry-cupping, after the manner of the Spaniards, which consists of exhausting the air from beneath a cupping-glass, and affixing the glass on either side of the lumbar vertebræ. The glass is then carefully to be drawn over and over the part in pain, which operation is to be continued for eight or ten minutes. Upon removing the glasses, the pain will frequently have entirely subsided. The operation should be repeated daily for several days, and the sufferer will be gratified to secure thereby the riddance of a most troublesome companion. In the case which introduced these remarks, the third or fourth application was perfectly successful.

Counter-irritation is generally looked upon as more likely to remove an effect than a cause, as we observe a dyspeptic take a carminative to allay flatulence, or use a tongue scraper to secure a clean mouth, albeit it often achieves its purpose ; and so long as it does so, it is hardly worth while to quarrel with the means. A due attention to diet and regimen need not be disregarded.

There is a popular prejudice against applying counter-irritation to the loins, lest retention or suppression of urine follow ; and hence medical men usually hesitate ordering blisters and embrocations on those parts, lest the remedy prove worse than the disease. My experience, however, reconciles me to such appliances, and I

can declare that I have seen the best results follow. I speak not from an isolated case, but there rarely passes a day but what I have recourse to the remedy I am extolling, and I can assure the reader, with the happiest results.

The foregoing cases are simple illustrations of the most frequent forms of *painful* annoyances of bladder and urinary affections. The description of urinary diseases, together with Liebig's theory of their causes, and their treatment, renders any further notice unnecessary, otherwise it need not be for a dearth of cases in a practice almost exclusively devoted to this class of affections, that more details are not given. In a work often alluded to, and one of tenfold magnitude to the present (*Porneiopathology*), cases illustrative of almost every position advanced may be found. The purpose of the present manual, I trust, therefore, has been fully answered.

The following sketches are from preparations in my museum, the history of which I am well acquainted with. Some of them fell under my immediate notice, whilst others were collected by exchanges and purchases from the original possessors. The design of introducing them in a work of this kind, is to show the changes the urinary structures are liable to, which, as all of them more or less, brought about the demise of the parties from whom they were taken

strongly bespeak the necessity of attending to the premonitory symptoms of disease.

The first drawing represents a bladder taken from the dead body. It exhibits a thickened state of its coats, and the protrusion of an enlarged lobe of the prostate gland into the bladder, which was interruptive of the flow of urine. The patient suffered some years before his decease from a difficulty of passing water. Instruments were constantly had recourse to, but the patient was a man of dissipated habits, and the disease was ultimately fatal

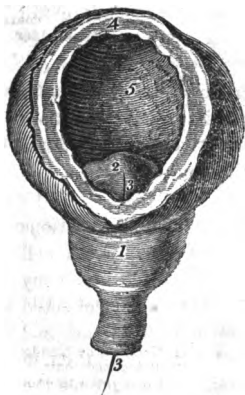


FIGURE XI.

- 1 Apparently swollen state of the neck of the bladder from enlarged prostate gland, with a protrusion of the inner lobe into the bladder.
- 2 Inner lobe.
- 3 Bristle, showing the course of the urethra.
- 4 Thickened cut edges of the bladder.
- 5 Interior of bladder.

The annexed sketch shows a relaxed condition of the membranous portion of the urethra,

and also the neck of the bladder, as see Figure V.



FIGURE XII.

- 1, 2, 3 The lobes of an enlarged prostate gland (see *Pornelapathology*).
- 4, 4 The interior of the bladder, with pointed ends of twigs, showing the situation of the entrance of the ureters into the bladder.
- 6 Thickened state of the coats of the bladder.

This case also proved fatal. It had been many years arriving to its present aspect.

Fig. XIII. is illustrative of a thickened and contracted state of the bladder.

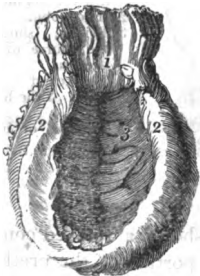


FIGURE XIII.

- 1 Neck of the bladder.
- 2 Thickened coats.
- 3 Corrugated interior.

Fig. XIV. shows the kidney to be united by an isthmus. The function of the secretion of urine was well performed. The preparation was taken from a child who died from other causes.

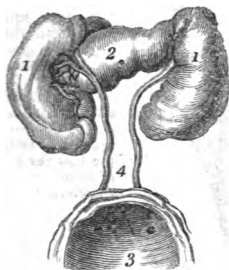


FIGURE XIV.

- 1, 1 The kidney.
- 2 The connecting isthmus.
- 3 Bladder.
- 4 Ureters.

Fig. XV. exhibits a complicated case of enlarged prostate gland, relaxed urethra, and thickened bladder.

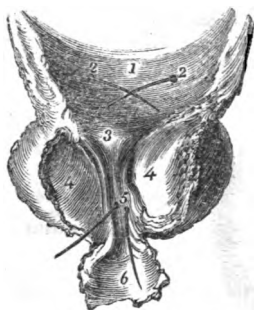


FIGURE XV.

- 1 Interior of the bladder.
- 2 Orifices of the ureters.
- 3 Inner lobe of prostate gland.
- 4, 4 Immensely swollen state of the lateral lobes of the prostate gland.
- 5 Openings of the seminal ducts.
- 6 Urethra.

The patient died in a hospital in a most deplorable condition.

Fig. XVI. represents a contracted and thickened state of the bladder, with an enlarged prostate gland, and swollen condition of the neck of the bladder.



FIGURE XVI.

- 1 Neck of the bladder.;
- 2 Interior of ditto.
- 3 Orifice of ureters.

The annexed is similar to the last.



FIGURE XVII.

- 1 Urethra.
- 2 Interior and upper part of the bladder.
- 3 Enlarged prostate gland.
- 4 Ureters.

These preparations were taken from individuals whose later days were passed in extreme suffering. They were mostly loose and abandoned characters.

The two remaining sketches represented a diseased condition of the bladder, with several strictures of the urethra.

FIGURE XVIII.—A Section of Bladder and Urethra.



- 1, 1 Contracted and narrow form of the bladder. 2 Entrance to ditto.
 seat of stricture. 3 Bulb of the urethra, shewing the
 culæ seminales. 4 Continuation of stricture, 5 Vesicle of the Pubis.
 6 Bone of the Pubis.

FIGURE XIX.—A Section of Bladder and Urethra.



- 1 Interior of bladder. 2 Entrance of ditto.
 3 Structure of the urethra. 4 Pubes. 5 Integuments.

For a more voluminous description of the progress, treatment, and result of cases similar to those given, the reader is referred to my work, so repeatedly quoted. Appalling as the exhibition may be of the afflictions represented, it must be borne in mind, that they were all aggravated cases, and the sufferers, whose days were shortened, had chiefly their own neglect and indifference to thank for the miseries they invoked. The Spartans, to excite horror of intoxication, exhibited a drunken slave to their own children. The example affrighted the youths from falling into a like error. It is humanely hoped these sketches may not be presented less usefully than the foregoing example.

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